

ProBCA TAXONOMY OF DISCRETE MCDA METHODS FOR RANKING

issue 3

Release Date:
01/11/2023

Organisation:

**Centre for Aeronautics
Cranfield University**
College Road
Cranfield
MK43 0AL
United Kingdom
<https://www.cranfield.ac.uk/>



| Authors | Position | Contact Details |
|-------------------------------------|--|---|
| Romans Kirenskis | PhD Candidate Centre for Aeronautics | r.kirenskis@cranfield.ac.uk https://uk.linkedin.com/in/roman-kirensky |
| Dr. Craig P. Lawson | Senior Lecturer in Airframe Systems Design Centre for Aeronautics | c.p.lawson@cranfield.ac.uk https://www.cranfield.ac.uk/people/dr-craig-lawson-749315 |
| Prof. Konstantinos Salonitis | Professor and Head of Sustainable Manufacturing Systems Centre Sustainable Manufacturing Systems Centre | k.salonitis@cranfield.ac.uk https://www.cranfield.ac.uk/people/professor-konstantinos-salonitis-803615 |

| | |
|---------------------------|--|
| Value proposition: | <p>This workbook is accompanied by the publication titled "A SYNOPTIC TAXONOMY OF DISCRETE MULTI-CRITERIA DECISION ANALYSIS METHODS FOR RANKING" introducing the presented taxonomy for MADM (Multi-Attribute Decision-Making) methods for ranking tasks.</p> <p>The taxonomy consists of:</p> <ul style="list-style-type: none">- the collection of 300 MADM methods enabling the various activities that constitute the MCDA (Multi-Criteria Decision Analysis) process;- the characterisation system for the recorded methods called ProBCA (Problem-Based Characterisation Approach). <p>The title (ProBCA) reflects an application-oriented mindset that the presented taxonomy is based on. It focuses on the DP (Decision Problem) parameters and how the DM (Decision Maker) deals with it to describe the presented methods, rather than the intrinsic characteristics of the methods itself.</p> <p>The taxonomy is operated by picking from the list of available values for each of the 17 descriptor parameters characterising the possible DP context specifics and DM constraints. If a method (or several) matching the provided DP characterisation is available in the presented collection, it will remain visible after filtering for appropriate values while the remaining methods will become hidden. It is possible to use partial DP characterisation to identify a range of potentially suitable methods if the DM is flexible about their way to define the DP and how to approach its solution. The number of methods matching each of the available characterising values is always shown next to these values in the top section of the taxonomy, and is progressively updated as the DM proceeds with value selection. The taxonomy is dedicated to allow a broad spectrum of DMs to efficiently select the most appropriate MADM method for their ranking DP at hand.</p> |
|---------------------------|--|